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Kate O'riordan [a]
[a] University of Sussex, Brighton, UK
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Human Cloning in Film: Horror, Ambivalence, Hope

KATE O'RIORDAN

University of Sussex, Brighton, UK

ABSTRACT *Fictional filmic representations of human cloning have shifted in relation to the 1997 announcement of the birth of Dolly the cloned sheep, and since therapeutic human cloning became a scientific practice in the early twentieth century. The operation and detail of these shifts can be seen through an analysis of the films* The Island *(2005) and* Aeon Flux *(2005). These films provide a site for the examination of how these changes in human cloning from fiction to practice, and from horror to hope, have been represented and imagined, and how these distinctions have operated visually in fiction, and in relation to genre.*

Images of cloning in contemporary fictional film operate in relation to the discourses of hope evident in factual forms such as news media, through an ambivalent and thus sometimes hopeful constitution of reproductive cloning in film. This ambivalence rests on the synthesis of reproduction and therapy, and the construction of realism through references to contemporary media genres outside of the film story. Human cloning is currently constituted as a story of scientific practice and biomedical hope through multiple sources and film is a critical component in this shift. However, rather than film bringing therapeutic cloning in to disrepute, the ambivalence of these contemporary tales of technoscience contributes to the intelligibility of human reproductive cloning as plausibly benign.

Introduction: Change and Instability in Human Cloning

The discourse of human cloning is a site where meaning has been under constant revision. There has been a particularly acute period of instability over the last decade, since the existence of Dolly the cloned sheep (born in 1996) was verified and made public in 1997. News of Dolly was read as an indication of the imminence of human reproductive cloning. Although human reproductive cloning did not emerge in this period, therapeutic human cloning has emerged as a scientific practice, and the first UK human therapeutic clone was produced in 2004.

Correspondence Address: Kate O'Riordan, Department of Media and Film, EDB, University of Sussex, Falmer, Brighton BN1 9RG, UK. Email: K.ORiordan@sussex.ac.uk

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In spite of the instability of meaning, and the anxiety about the distinction between therapeutic and reproductive human cloning, there are indications that both kinds of cloning are being formulated as intelligible. That is to say that human cloning has meaning within what might be thought of as the bounds of 'respectable science' in the UK and elsewhere (Gieryn, 1999; Haran, 2007; Haran *et al.*, 2007). By respectable science I mean that human cloning has become an aspect of the scientific practices of stem cell production under the aegis of regulators. Practices in human therapeutic cloning at the Newcastle Centre for Life, in 2004, are the evidence for this in the UK. In some policy arenas there are also some indications that human reproductive cloning might find a possible role within UK regulated science in the future.

In 2006 the government agency, the Human Fertilization and Embryo Authority (HFEA), responsible for licensing human cloning practices in the UK, anticipated an increase in therapeutic human cloning research related applications. This increase in activity in scientific and policy developments around human cloning has been mediated through narratives of biomedical hope and stem cell cures in factual genres such as press reporting. However, this understanding of human cloning as factual and hopeful is relatively new. Human cloning has more traditionally been mediated in terms of fiction and horror, and a significant site in this has been the cinema.

This article asks how changes in human cloning from fiction to practice, and from horror to hope, have been represented in films, and how these changes operate in relation to film genres. How has the filmic discourse of human cloning changed since Dolly was announced as a clone, and since therapeutic cloning became a scientific practice? How has the therapeutic–reproductive cloning distinction operated visually, and what does this demonstrate about the interactions of science and film?

Human cloning has been constituted in film as *reproductive cloning* (cloning babies/whole humans) through the conventions of horror and science fiction since the 1950s. These visual treatments have stressed the body of the clone, through the corporeality of the cloned body and the image of the clone as twin. However, contemporary filmic treatments of human reproductive cloning, such as *The Island* (2005) and *Aeon Flux* (2005), whilst still drawing on and reflecting fears about reproduction, focus on therapeutic uses and the process of cloning, and have thus become ambivalent, pointing towards hope. Ambivalence is used here to refer to 'having double meaning' and constituting meanings that are contradictory. These films link the process of cloning to hopes of medical application and therapies, and as I will show in the following analysis, they also figure reproductive cloning as hopeful in some instances.

The shifts from the horror of the body of the clone, to ambivalence about cloning as a process have occurred within a changing global context. Through multiple sites in the USA, South Korea and the UK, therapeutic cloning has been framed as a potential source of a revolution in health care in the last decade. Understandings of human cloning as *therapeutic*, as a process and as a source of stem cell treatments and cures, have become dominant frames in the science, policy and news media of the 1990s and early twenty-first century (Williams *et al.*, 2003; Mulkay, 1997; Parry, 2003). These contemporary biomedical representations of cloning as a global technoscience have been constituted through a visual language of cloning which is hopeful and less fixed on the corporeality of the clone. The twin, as the embodied icon of cloning, has been replaced with images of process, of cell enucleation, stem cells, or the somatic cell nuclear transfer derived embryo. Cloning has become

a matter of stem cells and in this transition it has been harnessed to the discourse of biomedical hope through which imagined stem cell cures are figured in factual media genres.

Language of Cloning: Mediation and Practice

Human cloning in film was, until recently, found almost exclusively in what might be termed the niche market genres of science fiction and horror (Hills, 2003; Stacey, 2003; Thacker, 2002; O'Riordan, 2008).[1] These include medical horror films of the 1970s such as *The Resurrection of Zachary Wheeler* (1971) and *Parts: The Clonus Horror* (1979) as well as the 'body horror' films of the 1980s such as *The Fly* (1986). However, as has been argued elsewhere, the technoscientific themes of these niche market and genre-specific products have expanded into successful multi-genre, mass market formats since the 1980s (Best & Kellner, 2001; Hills, 2005; Wood, 2002). Although, for example, *Jurassic Park* (1993) is not about human cloning it is an early and dramatic instance of the successful re-packaging of biotechnology (and other technosciences) as a mass market, multi-genre product (Franklin, 2000; Stern, 2004; Wood, 2002). Many filmic cloning themes and story lines, since 1997, have been in mass-market films—by definition multi-genre—and they have dealt ambivalently with human cloning. In some films this includes hopeful moments in the figuring of reproductive cloning. Lacking the distinctive imprint of horror, imparted through that genre's treatment of cloning and other forms of genetic engineering (Hills, 2003, 2005), contemporary human cloning might almost be a positive cinematic theme.

In factual media genres the distinction of the term cloning has become blurred through a number of moves. Subsequent to the cloning of Dolly, somatic cell nuclear transfer (SCNT) as a scientific practice in humans became (re)referenced as cloning.[2] Somatic cell nuclear replacement and cell nuclear reprogramming have also entered the contemporary discursive terrain of human cloning. During the late 1990s and early twenty-first century, the distinction between therapeutic cloning and reproductive cloning, and anxiety around this, became crucial in the political debates about regulation and governance in the UK. This distinction was key in a particular moment of science policy formation—the licensing of therapeutic cloning—and its emergence as a UK scientific practice in 2004 (Haran, 2007; Mulkay, 1997; Parry, 2003; Williams *et al.*, 2003). A factor in these distinctions in the visual imagery of cloning is whether the foregrounding is of the body of the clone, or cloning as a biomedical process. It is this latter vision of cloning as process that has become dominant and this inflects representations of cloning, including recent representations of the cloned body.

In many references to biomedical processes of somatic cell nuclear transfer, 'cloning' has dropped out of the science and policy vocabularies altogether. In some representations therapeutic cloning has become conflated with creating stem cells. An example of this conflation (which until this point had been largely implied rather than literalized) occurred in 2007 in the UK Sunday newspaper, *The Observer*, in a story about the announcement that the HFEA would licence semi-commercial egg sourcing by allowing financial compensation for 'donors'. At the end of the article a paragraph subtitled 'the role of stem cells' described the creation of stem cells as follows:

> To create stem cells, an egg is taken from a woman and its nucleus removed. Then a cell is taken from a patient, its DNA scooped out and placed in the nucleus-free egg (Dennis Campbell, Sunday 18 February 2007).

The description of enucleation and nuclear transfer used above had previously been attached to definitions of therapeutic cloning, which had in turn been attached to embryonic stem cell cures. Although the paragraph above is clearly a matter for correction as it describes cell nuclear transfer—not the more general creation of stem cells which can be derived from multiple sources and do not require cell nuclear transfer *per se*—it illuminates the extent to which therapeutic cloning and embryonic stem cell cures have become conflated in the contemporary media ecology.

The unequivocal link between human cloning and cures in factual genres is made through figuring it as a source of embryonic stem cells, DNA matched stem cells, and information about cell development (Franklin, 2006; Waldby & Mitchell, 2006). Embryonic stem cells in particular are currently represented as the future of the biomedical sciences, and thus of society. This process and cures focused repertoire displaces the body of the clone. Instead, images of people getting up out of wheelchairs (Christopher Reeve, Won Rae Kang), or stories of the promise of cures for motor neurone disease (Jimmy Johnstone, Ian Wilmut), appear in multiple coverage about stem cells in the press, and other media forms globally (Haran *et al.*, 2007).

Contemporary filmic renderings of cloning draw on these factual genres in the process of locating science themes in mass-market film. Films reference the conventions of science communication, news media and documentary, examples of these other forms appear on screen, and films borrow from the message of hope. Through these moves cloning appears through an intertextual realist aesthetic, constituted through contextual references to factual genres circulating at the same time as the production, release and circulation of the film.

Context of Cloning in Film: From Horror to Ambivalence

Human cloning has been traditionally embedded in film through a set of images and stories dealing with horror, abjection, monstrosity and the uncanny (Stacey, 2003, 2005; Battaglia, 2001; Hills, 2003). This embedding, in part reflective of the historical relationship between film and literature, also located cloning as a form of genetic modification investing cloning as horrific through the associations of mutation (genetic modification), twinning, and the creation of life (golems, Frankenstein). In some older films, cloning has been coupled with associations of evil in an exchange of meaning, which reinforced the horror of both cloning, and the social issue it was tied to. An example that retains currency in contemporary debates is the film *The Boys form Brazil* (1978). This film (based on the novel by Ira Levin) has become a touchstone for discussions of cloning, and its coupling of Nazi eugenics with the cloning of Adolf Hitler seemed to reinforce images of the horror of social control through science.

Invoking the horror of cloning through references to *The Boys from Brazil* has seen a return in a recent popular science book which, conversely, puts the argument for *therapeutic* cloning; *After Dolly: The Uses and Misuses of Human Cloning* (Highfield & Wilmut, 2006). *The Boys from Brazil* is referenced repeatedly in the book as an example of what human cloning will not be used for. The reference operates in this

context to repudiate specific types of cloning (reproductive) in the attempt to secure other types of cloning (therapeutic) as intelligible (Haran *et al.*, 2007). In this way film, novels and other fictions are repeatedly positioned as the sites at which misleading information about science is produced, and this popular science account by Roger Highfield and Ian Wilmut reiterates this. According to many journalists, and scientists, concerned with science communication, films and novels are the sources from which various publics get their misconceptions and fears (Turney, 1998; Frayling, 2005; Henderson & Kitzinger, 1999). In current debates circulating in the news media and popular science writing in the UK, horrific visions of human cloning in fiction are used as a marker for what human cloning won't be in fact.

Human clones, and otherwise genetically modified humans have been represented as monstrous, and evil, in a range of films. These include the overlapping genres of medical horror, body horror and science fiction already referenced. Images of cloned bodies also bear traces of links to versions of nearly human others, such as automata, golems, robots, vampires, AI, other animals and aliens. Fictional human cloning scientists, and figures in factual genres who have proposed or laid claim to reproductive cloning (Dr Panos Zavos, Brigitte Brosselier, Severino Antinori, Richard Seed) have also been represented as 'maverick', weak or evil. Fictional characters and such factual 'maverick' characterizations are often based on archetypal figures of the scientist such as Dr Faustus and Dr Frankenstein (Frayling, 2005; Haran, 2007; Haynes, 1994; Nerlich *et al.*, 2001; Turney, 1998; Van Dijck, 1998; Weingart, 2003).

A range of actors interested in human genetic modification and cloning, including scientists, politicians and celebrities, have highlighted the significance of such representations, primarily by expressing concerns that publics will continue to be so misled by these images that human biotechnology—and particularly cloning—will never lose its negative associations. This rhetorical move was used in criticism of the 2004 horror film *Godsend* (Haran *et al.*, 2007; O'Riordan, 2008). This cloning film stuck to the vision of both cloning and genetic modification as horrific, and evoked 'maverick' cloning claims (Haran, 2007). It was criticized at the time of release for potentially giving cloning a bad name and it was suggested that this might impact on future biomedical cures by setting back research.

> Still, there is a danger in *Godsend*'s fear factor—that the distinction between reproductive cloning and therapeutic cloning will be blurred even further by the film and by the fake but all too credible website.
> Already, many people confuse reproductive cloning with therapeutic cloning (. . .) (Ewing Duncan, 2004).

Such adverse publicity worked in the film's favour, generating (along with its elaborate marketing strategy) controversy, and therefore access to audiences, which it might not otherwise have had. However, the film's dependence on visions of cloning as horrific contributed to the incoherence of the plot and its inability to either be particularly horrific or convincing. The early part of the plot attempts to take up cloning as horrific but the visual representation of cloning as 'just like normal IVF' (*Godsend*), leaves the audience without the required element of horror, suggesting that there is little to fear from cloning.

The birth of Dolly in 1996 secured the contemporary meaning of human cloning as equivalent to somatic cell nuclear transfer (therapeutic cloning). Subsequent to this event, and to the later announcement of the completion of the mapping of the human

genome in 2000, numerous films with human genomic themes have been released.[3] These are a diverse set of texts, many of which stick to traditional cloning scripts, albeit with a contemporary reworking. In addition to mass market, multi-genre films such as *The 6th Day* and *The Island*, many of them are also niche market genre films (horror or science fiction), national or independent films, and many of these assign cloning to the imaginary of horror (e.g. *Blade II, Godsend, Parasite Eve*). However a significant number (and this category appears to be increasing) of both mass market and niche market films explore genetic modification and human cloning in a much more ambivalent way that edges towards a more positive, if not favourable, constellation of meaning around human cloning.[4]

Some of these ambivalent or more favourable films are versions of the Marvel or DC superheroes revisited. In each instance of these remaking of marvellous mutants (*Blade II, Fantastic Four, The Hulk, Spiderman, X-Men*), the stories have been updated to draw on genomic sciences; genetic mutation or cloning. Where the plots illustrated in earlier decades relied on nuclear science and ideas about radiation and rays, in these remakes, genomics, (although never central to the onscreen plot), has come to the centre of the explanatory back-story. For example, in Ang Lee's 2002 remake of *The Hulk* the green colour of the hulk is explained through references to green fluorescent proteins (used as a marker in genetic modification experiments), one of many distinctive references in contemporary visual languages of genomics. Likewise the *X-Men* are explained in terms of the 'evolutionary' step of genetic mutation and in *Spiderman* the centrality of the radioactivity in the graphic novel is supplanted by the emphasis on genetic mutation in the film. However, although ambivalent and in some cases celebratory, these Marvel films draw on a more general language of human biotechnology whilst it is the specifics of human cloning that are my concern here.

Two other films that contribute to the contemporary ambivalence about human cloning in film are the niche market films *Code 46* and *Blueprint*. In *Code 46* (Michael Winterbottom, 2003) a version of cloning is normalized in the film narrative through its introduction as an assumed back-story. As the plot unfolds it is revealed that the widespread use of reproductive technologies has dislocated reproduction from kinship through the use of 'batches' of derived and stored embryos. Whilst one of the central characters is a clone (Maria), the ontology of cloning is mundane and lacks visual significance in the film.

In *Blueprint* (Rolf Schubel, 2003) cloning is produced as an unusual spectacle through its representation in the story world of the film as a scientific breakthrough. The child who is cloned is a 'first' and a tag line of the film is; 'The story of the first cloned human being—told in her own words' (*Blueprint*, 2003). However, the implications of cloning for those involved, and the wider society, is explored in a variety of ways which do not provide closure on the meaning of cloning, as either hopeful or fearful. Ultimately the experience of being a clone is normalized through the characterization of the cloned child as she grows up and becomes an adult. However, the desire to have a clone is pathologized through the negative characterization of the mother. Thus, the cloned body is no longer the repository of horror, although the social uses of cloning—in this case the narcissistic desire to preserve one's own talents—comes under critical scrutiny through the characterization of the mother as a selfish and negative character.

However, the two films that are most central to this argument that there is a current mass-market reconfiguration of human cloning from fearful, to ambivalent and favourable, are the films *Aeon Flux* (Karyn Kusama, 2005) and *The Island* (Michael Bay,

2005). Distributed from 2005 by Paramount and Warner respectively, these two films use cloning as a central plot mechanism. In these films a visual language of genomics (I explore this 'language' in the next section) is deployed to create meaning about cloning, and a context where cloning is plausible and normalized. *The Island* is a particularly ambivalent text, at once representing a moral anti-cloning message, whilst representing clones as desirable humans, and cloning as an attractive health care option. In *Aeon Flux* there is little trace of horror in relation to human cloning, and reproductive cloning briefly takes centre stage as not just a health care option but a method of saving the human species from extinction. After an analysis of the ways in which cloning is visible in film more generally, I examine current visions of health and reproduction through the analysis of *Aeon Flux* (2005) and *The Island* (2005).

Visual Cloning Distinctions: Bodies, and Medical Processes

In film one of the most dominant visual signifiers for cloning has been that of the twin, and associations of the monstrous or the uncanny of the double also continue to cohere around this image.[5] However this centrality is not limited to film and in both the social and natural sciences twin studies are used to derive meaning about human cloning. Descriptions of cell nuclear transfer as a scientific practice also use the language of 'identical' and 'copy' and 'DNA matching' to describe these processes. Human clones are represented as the physiological twin of their 'origin', through a number of sources. In multiple genres and across factual and fictional forms, issues raised with some frequency are those of uncanny similarity and identity confusion. Examples of films that mobilize these understandings of cloning include: *The Boys From Brazil* (1978); *Multiplicity* (1996); *The 6th Day* (2000); *Blueprint* (2003) and *The Island* (2005). The twin provides a key visual sign, and clones can be seen on screen because of this twinning. They are visually figured as physiological twins through the use of the same actor for multiple characters, and special effects contribute to this representation of the clone as twin on screen.

However, although the twin has been the visual icon of cloning there is no evidence to suggest that SCNT derived humans would look identical. The issue of temporality seems incommensurable (i.e. a clone would not be born at the same time as the donor), and there have been multiple animal experiments that suggest that reproductive cloning is unlikely to produce visual and embodied physiological twinning. Current understandings of cloning in the biomedical sciences in the UK are that cloning is equal to somatic cell nuclear transfer, and that DNA matching (but not DNA or physiological mimesis) is possible. This scientific understanding has emerged through the evidence of the viability of the technology used to create Dolly at the Roslin Institute in Scotland in 1997. It was claimed internationally that Dolly was a clone and the international reaction that cast Dolly as a precursor to human cloning contributed to the current understandings of human cloning as somatic cell nuclear transfer (SCNT). The technique which produced Dolly involved cells from two different animals, as well as a succession of hosts, so a stricter model of cloning as an identical genetic copy would preclude Dolly. However, even Professor Ian Wilmut, who led the team who created Dolly, defines Dolly as a clone, and also defines cloning as the 'copying' of DNA. Thus, the clone as a material copy is as resonant in the scientific imagination as it is in film.

However, there are a range of other images in addition to the twin, that circulate through film narratives to let audiences know that they are watching a story about genomics, and to

invite them to suspend their disbelief and imagine that the science is factual within the film story-world. These are the visual languages of the human genome map, sequences and chromosomal pairs, somatic cell nuclear transfer (SCNT), and the alphabetical codes of the base pairs (ACGT), explicitly marked in *Gattaca* (1997), *The 6th Day* (2000), *The Hulk* (2003) and *Code 46* (2003), where these visual cues appear on screen. The visual image of enucleation and cell nuclear replacement processes in which the cell wall is penetrated, and the nucleus removed or transferred, seen through a microscopic perspective, has become almost ubiquitous and is used widely across news media to signify stories about cell stem research and therapeutic cloning (Kitzinger & Williams, 2005; Franklin, 2005).

Visual images travel across media forms and genres, and common images are found in different contexts, including film, the press, and the arts. In the film, *The 6th Day* (2000), the opening sequences draw on images from television and news reporting to establish the filmic cultural context. The images used are drawn from television news coverage and include icons such as 'Dolly' in order to produce a back-story leading to the rationale for the banning of human reproductive cloning. In this pre-history of the film a near future scenario is portrayed in which human reproductive cloning has been attempted and then banned. Television news and press images are used to create a realist aesthetic in the fictional film and this is constructed through the use of factual genre conventions. In this instance fictional footage follows documentary footage merging the two in a montage of extra filmic factual news and fictional 'news' in the film narrative. This provides the historical framing for a future of biotechnology gone wrong, providing a reference point for the case for legislation against human reproductive cloning made in the film and anchoring the film in a dramatic aesthetic realism.

The Hulk (2003), based on the graphic novel and television series of the same name, draws on images from the press and scientific writing and notation to set the genomic scene. The alphabetical symbols reproduced in *The Hulk* were also used explicitly and eponymously in *Gattaca* (1997), referenced in *Code 46*, and they are used in much visual art work around genomics including that of the 'transgenic' artist Eduardo Kac. Chromosomes, especially shown as pairs (karyotypes), are also familiar images from fine art and 'microscope' shots in film, as well as from television representations of science, including documentary and news reporting. The alphabetical notation and the paired chromosomes are also common symbols which appear across multiple sites including the websites of the Human Genome Project, The Wellcome Trust, the US National Library of Medicine and biotechnology companies such as Celera. The gene sequencing represented in *The Hulk* is a direct reference to the human genome mapping project and this underpins the scientific 'updating' of the Marvel plot in this film.

The science scenes of *The Hulk* were shot on location at the Lawrence Berkeley National Laboratory. Many of the genetic experiments represented in the first part of the film involve jellyfish and sea-cucumbers. They are expressed as a series of montaged flash-backs that intersperse shots of vivisection, centrifuges, microscopes and hand written notes about genetic experimentation including repeated use of the alphabetical symbols used to express genetic codes. The green traces from the jellyfish (Green Fluorescent Proteins) are the first visible indication that the Hulk has inherited the alterations that the father has made to himself. This 'green' property, used in contemporary genetic experiments to 'mark' genetic alterations, is also used to indicate genetic manipulation in a range of other texts including Eduado Kac's transgenic artwork *GFP Bunny*. This intertextuality

continued to unfold when the *GFP Bunny* was also visually (re)referenced in a scene in the independent feminist cloning film by Lynn Hershman Leeson, *Teknolust* (2002).

Whilst there may be an absence of visual signifiers for the gene *per se* (Stacey, 2003), there are visual repertoires, which are drawn from a variety of other sources. These include other filmic representations of science, as well as images from the documentation of the life sciences, the press, television news, science communication centres and fine art. These visual repertoires of genomics link media texts, forms and genres across the discourse of cloning and contribute to the exchange of meaning and constitution of realism across different forms. They provide frameworks of signification within which factual and fictional versions of cloning can intersect. Within this visual language there are iconic images; the double helix, the clone as twin, the clone as sheep, cell nuclear transfer, *in vitro* embryos, green fluorescent proteins, the alphabetic notation of the base pairs, and karyotypes of paired chromosomes. Currently the processes of nuclear transfer, synonymous with cloning since Dolly, and the image of the twin, which is reinforced by the reiteration of copy and regeneration, are dominant images in contemporary visual cultures of cloning.

The Island

In *The Island* (2005) the audience is invited to imagine a near future in which human cloning technologies have been successfully developed in the service of commodifed health care. In this near future scenario the production of full body clones, DNA matched to originary donors, has been 'perfected'. The film taps into current cultural imaginaries where human cloning is figured as the future of individual health care, through DNA matched stem cells, and it represents human reproductive cloning as a health care technology. Like the films mentioned above, the film draws on contemporary images and factual genre conventions to locate the text in relation to factual references, or realism, and to anchor it as topical. These are strategies designed to appeal to and engage a wide audience share. Human cloning is represented as a successful route to DNA matched replacement tissue, body parts and babies, the ultimate in personalized medicine. This close mapping onto contemporary biomedical cloning discourse and the factual genre conventions within which this is constituted, foregrounds regeneration and cures (Haran *et al.*, 2007). This in turn locates the film as a topical drama. It is thus positioned as having a capacity for social commentary through its references to contemporary extra filmic cloning discourse, and other biopolitical debates including the commodification of the body, health, organ donation, and death.

The Island figures the medical clone through the cloned body which, drawing on existing languages of cloning, is visually signified through the twin. The cloned bodies are represented as beautiful and normative through this figuration that allows the repetition of images of celebrity within the film. For example, the celebrity actors Ewan McGregor and Scarlett Johansson play the characters of both the clones and the celebrity clients from whom the DNA has been matched. Thus, the actors are repeatedly referenced on screen through their multiple roles, and their extra filmic personas as celebrities are also emphasized and referenced through the plot. (For example, an onscreen bill board poster of the celebrity played by Johansson in the film references the off-screen bill board advertisements on which Johansson herself appears in off-screen perfume advertisements.) The cloned characters are introduced first in the film chronology, and their characters are developed through the narrative arc before those of the 'clients', from which

the clones are grown and for whom they will provide organs. Issues of twinning, copying and the uncanny thus only come into play late in the film narrative when the cloned characters discover that they are clones, and the clients appear on screen, through images such as the bill board advertisement image. These appearances culminate in an encounter between a clone and clonee, both played by Ewan McGregor. The primacy of the characters of the clones (over the clients) is gained through this narrative ordering.

Through the narrative explanation that the clones are created in order to provide DNA matched replacement tissues, human cloning is represented as both therapeutic and reproductive. Thus, the film brings together both therapeutic human cloning as a biomedical process and reproductive human cloning as the production of cloned bodies. This representation differs from those found in news reporting on human reproductive cloning. However, it matches the representations of therapeutic human cloning in factual media, in that cloning is not primarily a reproductive technology for producing babies in *The Island*, but is for (re)producing DNA matched adult tissues. Thus, although cloning is reproductive in that it is a technoscience which (re)produces human bodies, the core representation is not a reproductive technology but a highly technologized and commodified form of health care. However, in representing the biomedical ideal of DNA matched tissues as demanding the construction of sentient humans, the film plays on the therapeutic/reproductive distinction, which has been so crucial to scientists in the UK. In making an explicit play on the therapeutic/reproductive distinction by refusing it, the film appears to produce a visual intelligibility to the arguments that even bundles of cells are human. This film thus sets up a visual imaginary that maps onto the cures narratives of stem cell stories but it replaces the cloned embryos (required for regenerative medicine in biomedical discourse) with full grown humans thus also evoking those arguments that embryonic tissue has personhood.

The doubled reproductive capacity for therapeutic cloning to produce both babies and replacement tissues (Franklin, 2006) is emphasized in the plot of the film in a horrific scene when one of the clones gives birth to a baby. The clone is killed off and the baby is given to the client parents who grew the clone to be a physiological match with the new 'mother'. In this film then cloning is *not* used to produce babies for the childless, which is a common trope in other films, and in news, and television drama. Cloning technologies provide instead, cloned adult bodies with the capacity to give birth to DNA matched babies for the clients who have had the clones grown as a health care option.

The image of cloning as an elite and desirable health care option is emphasized in a scene in *The Island* in which the fictional biotechnology company pitches the cloning service to prospective clients. The wealth and celebrity status of the clients is emphasized. The highly technologized visual effects used to market the products (the clones) as the ultimate in personalized health care, effect the same kind of doubling observed in relation to other high tech versions of technoscience (such as *Jurassic Park*; Franklin, 2000; Stern, 2004; Wood, 2002). Like *Jurassic Park's* on-screen promotional techniques, in *The Island* the visual technologies of film production appear to valorize the technoscience of cloning by promoting it within the conventions of high tech Hollywood production, special effects and celebrity actors (Stern, 2004; Wood, 2002). Thus, there is a discrepancy between the moral message and the production values. As Megan Stern and Aylish Wood have both argued in relation to other instantiations of cinematic technoscience (Stern, 2004; Wood, 2002), mass market films like *The Island*, which overtly criticize the

dehumanizing power of commodity science through big budget spectacle, embody a parallel power at the level of production. At the same time as this visual valorization occurs the narrative development warns against cloning as a new form of slavery, and thus unacceptable in the contemporary USA, where the film is produced.

In news coverage of human cloning as a therapeutic practice which leads to cures, there is a dominant discursive repudiation of human reproductive cloning as a fictional horror. However, in this film the fictional figuring of reproductive cloning as therapeutic points to those contradictions produced through the figuring of reproductive technologies (such as IVF) as therapeutic in factual genres. In current discourses of IVF, reproduction is represented as the cure for the now institutionalized medicalization of infertility. IVF 'treatments' are offered on the National Health Service in the UK and infertility clinics world wide, through a discourse that represents childlessness and infertility as an illness (Pfeffer & Woolett, 1983; Franklin, 1990). Thus, contemporary dominant representations of IVF frame reproductive interventions as therapeutic practices and 'babies' are also connotatively therapeutic as the imagined cure for the 'illness' of infertility. Thus, even in biomedical discourse in factual media forms, therapy and reproduction are intertwined and sutured. The film plays on this suturing by combining a biomedical cures narrative with visions of reproductive cloning, invoking both the issue of what constitutes human life, and discourses of infertility.

The Island represents human cloning as primarily a health care option for the rich, an image that is resonant with the anti-cloning arguments in the news media that it is a 'boutique' issue. In the film the clients are led to believe that the clones are non-sentient beings of some kind, called 'agnates'. However, the biotechnology CEO reveals that these so called agnates failed to produce healthy human organs and tissues, leading the scientists to conclude that the experience of living human lives was required to develop such materials.

In the film the audience is shown very few examples of the use of DNA matched body parts as cures. In other words, although deploying a cures narrative it also undercuts this narrative by never actually showing these 'cures' in action. Horrific scenes of attempts to harvest tissues from the bodies of the clones, and the death of the clones in these scenarios act to secure audience sympathies with the clones from whom the tissue is harvested, rather than the clients who desire the replacement tissues and organs or surrogate babies. In one scene the audience is privy to a conversation between medical staff in the fictional cloning facility as they discuss the low chances of successful cures though these techniques, a conversation that suggests that the clones are sacrificed to no therapeutic purpose. This indicates to the audience that cloning as a health care option, despite the glossy desirability promoted in the on-screen advertising, might not be the best frame for thinking about investment in health care in any case. Thus, although the clones are represented as beautiful, and the promise of restoration is represented as highly desirable and aesthetically pleasing, the film undermines the project of cloning as curative both by representing the clones as unequivocally human, and by the lack of visual representation that the promised cures are effected. Within this film then, although cloning is removed from the frames of horror and is represented in some ways as desirable, the narrative ultimately undermines the hope of cures. This occurs by offering the audience the opportunity to identify with the clones and not with the existing populations to which their bodies may be sacrificed in the name of health care.

Whilst this film does not produce a hopeful narrative about cloning it opens up ambivalence by advertising it visually in the film. It also significantly changes the location of

human cloning by producing it through a mass-market action film format. Whilst the narrative development is only hopeful in its utopian refusal of cloning, the aesthetic promotion of cloning as desirable creates ambivalence and extends filmic visions into the realms of biomedical hope. This change can be seen more clearly when this film is contrasted with its precedent *Parts: The Clonus Horror* which was a 1970s 'b-movie' horror film. The changing context of cloning can be seen in terms of the changes between these two films—where *Parts* was unequivocally a niche market horror film, 20 years later *The Island* is a mass-market multi-genre, blockbuster.

Aeon Flux

The second film that marks a shift in the filmic representation of cloning, from horror, through ambivalence and towards hope, is *Aeon Flux*. This film offers the possibility of a hopeful narrative for cloning futures. The premise of the plot is that all humans are cloned. Like the clones in *The Island* [and referencing *Blade Runner* (1982) and *The Matrix* (1999)], an ontological uncertainty is brought into play, as the clones (and initially the audience) are not aware that the characters are clones. The main character of *Aeon Flux*, also called Aeon Flux, is a revolutionary agent attempting to sabotage the totalitarian government of the only human society left on Earth. This singular society is the residue of contemporary populations, the result of a global health disaster which wiped out most of the human population through viral infection. Science is ostensibly presented as the hero of this tale as the audience learns through the back story that a vaccine for the virus was developed by a group of scientists in time to save a small selection of humans. The mystery of the film, or the problem disturbing the narrative equilibrium, is the question of why the existing community feels haunted, why people disappear without explanation, and why they appear to have false or unexplained memories. Like *The Matrix*, the conditions of 'reality' turn out to be different than those first perceived. The 'secret' to be revealed in this narrative is that the vaccine also caused infertility and cloning became the only way to save the small group who had been vaccinated against the virus.

One of the twists in the plot of *Aeon Flux* is that the population are not 'real' people but that they are all clones of the original survivor group of 400 years past, and this version of 'reality' is uncovered by Aeon. She eventually frees the society from the constraint of cloning, which appears to be having deleterious effects on the physical and psychic health of the people. They are described as 'wearing thin' and through the aesthetics of the film they are represented as decadent in the sense of slightly ephemeral, ghostlike or virtual. The ruler of the city, Trevor Goodchild, is the clone of the scientist who helped discover the first vaccine and he has worked tirelessly, throughout his multiple life times, to try and find a cure for the infertility of the population. He has simultaneously been cloning the population, along with the ruling elite who control this process and who hide its existence from the general population. Although this scientist is heroic and he and Aeon turn out to have been lovers in their 'first' life—a connection they renew in their cloned incarnations—he also has an evil brother who prefers the material control of cloning. This brother undermines the pursuit of the cure for infertility by sabotaging Trevor's work and by killing off people who have begun to reproduce without the help of cloning. It is this character that Aeon and Trevor have to combat to reveal the cloning plot and 'free' the people from this compulsive return to the same.

Cleary, *Aeon Flux* doesn't lay claim to naturalistic aesthetic realism, it draws on a retro futurism and a digital aesthetic. It references science fiction genres and computer games, and is based on an animated MTV series of the same name.[6] However it uses the present of the release of the film as the starting point of the back story that starts 400 years previously. This temporal dimension, common to science fiction, asks the audience to consider the risks of a global pandemic and the feasibility of reproductive cloning as part of their contemporary reality, whilst at the same time the film provides an alternate reality that is so far into the future as to be in a different dimension to that of the film's release. This temporal technique of connecting the filmic future to the off-screen present is also used in *Code 46*, *The 6th Day* and other science fictional mass market cloning related films such as *The Matrix* and *The Island*.

Through the temporal framing that locates the narrative starting point at the time of the film's release, cloning is cast as a species saving technology in the present of the film's reception. Drawing on the figuration of contemporary cloning as regenerative (through therapeutic cloning, stem cells, and causing the lame to walk), *Aeon Flux* pushes this scenario further by using reproductive cloning (the repudiated other of news media) as the salvation technology. Like *The Island*, reproductive cloning becomes therapeutic, in this case because infertility is what ails the human. The film figures the IVF/cloning interface (Franklin, 2005) as the mechanism for saving humanity. This occurs through the representation of cloning as a reproductive technology (like IVF), and locates cloning as simultaneously a reproductive and a therapeutic technology (like somatic cell nuclear transfer). Cloning is reproduction with a therapeutic effect—saving people from death—effectively putting humanity on hold whilst pursuing future cures for infertility.

The hope of reproductive cloning as a therapy in this film is, however, temporary and ultimately cloning is rejected in favour of nature, defined as 'life' in the film. The film closes with an echo of a line from *Jurassic Park* which extolled 'nature finds a way' (*Jurassic Park*), predicting that the genetically programmed sterility of the dinosaurs would be overcome. In both *Aeon Flux* and *Jurassic Park*, cloning operates to save a species from extinction and in *Aeon Flux* it provides a temporary (400 year) solution—that of allowing the human race to 'evolve'—moving them on from a scenario with no future to one with a future. However, at the end of *Aeon Flux* rather than pursuing cloning to overcome the sterility of the humans, Aeon believes that an emergent natural vitalism will provide the solution in the future; 'life finds a way' (*Aeon Flux*) and she destroys the DNA repositories of the population stored in the 'relical'. Thus, in both *The Island* and *Aeon Flux*, and unlike factual genres, the embrace of technoscience can be resisted and innovation turned back or rejected.

Aeon Flux represents cloning as normative through a similar technique to that used in *The Matrix* to make cyberspace look 'real' (O'Riordan, 2004). This is the representational technique of making cloning the already present reality when the film opens. In other words the status of the characters as clones is not revealed until the film narrative is well under way, by which time the audience has already been offered the opportunity to identify the clones as 'real' human characters. Thus, cloning is not a spectacle in the film narrative but an explanation, an origin story, retrospectively revealed after the audience has been asked to accept the characters as human. This mode of representation moves away from representations of the corporeality of the cloned body and the use of the twin (although the twin is introduced in flash backs to the past in which the characters look

exactly the same). However, this biomedical mode of representing cloning does not entirely eliminate the negative associations of cloning. Cloning is still figured through twinning and this is the source of psychic disquiet for some of the characters who cannot understand why some faces are familiar to them. Although the whole population looks the same in each generation, the clones are born to different people at different stages of their lives through the elaborate subterfuges of the ruling elite.

The biomedical model of cloning in *Aeon Flux* is negatively charged through the concept of 'wearing thin'. Although the characters are mainly played in real time by actors, the aesthetic of the film is similar to that of computer and video game graphics. This digital aesthetic (Darley, 1998) renders the characters as virtual, digitized and slightly unreal or decadent. Much of the film has the look of a high resolution game and this aesthetic digitization contributes to an informational model of cloning where the process contributes to a dematerialization and a virtualization of the body. These aesthetic qualities are used to lend weight to Aeon's argument that cloning is bad for them and they need to be released from this endless reiteration of self.[7] At the end of the film the informational technoscience of cloning is banished in Aeon's claim that 'nature will find a way'. This closing sequence, and Aeon's rejection, ultimately repudiates cloning at the level of the narrative in the story world of the film.

Time is a key dimension in the repudiation of cloning. In a kind of negative entropy model of materiality the bodies of the clones and their integrity as individuals wears out over time. Aeon is the only character who has not been cloned multiple times and she retains a moral and energetic vitalism that the other characters largely lack. Through a plot direction involving the evil brother, Aeon was not cloned with the rest of the population but her DNA was preserved in 'the relical' repository. Thus, it is 400 years later that Aeon is cloned for the first time, in contrast with the rest of the population who have been repeatedly cloned over this period. The film narrative emphasizes this aspect of Aeon's character as the source of her ability to overthrow the status quo and move beyond cloning. The fact that she is only cloned once is what constitutes her ability to represent vitalism and thus heroism. Aeon is still, however, both a clone and the hero of the film. Thus, reproductive cloning, when it is in the service of replacing someone who's skills are beneficial to the society, is represented favourably. Even though cloning as the only form of reproduction (and therapy) is rejected overall, cloning as a saviour technology in extreme cases is represented as hopeful through the characterization of Aeon who comes back, through time and through cloning, to save humanity from cloning itself.

Conclusion

This article began by asking how the changes in the status of human cloning from fiction to practice had been represented in film. This is an important question partly because mass market film has a much wider audience than any other 'engaging science' activity, even when it demonstrates box office failure. In debates about what cloning means, and how much and what kind of cloning should be encouraged, film is an important point of intersection between science communication, public engagement with science, scientific engagement with publics, and entertainment.

The question of how cloning is imagined and how that imaginary crystallizes in film texts is important at this juncture particularly because the governance of this field is

under revision. Scientific practices, policy, and funding regimes are all dealing with what cloning means. In the UK (where a human embryo was cloned in 2004), cloning has a very immediate and contested significance at scientific, economic and policy levels. In the UK, human cloning technologies are permitted under certain conditions, defined as 'therapeutic cloning' but the UK is revising its regulatory framework for cloning related practices.

The visual discourses of human cloning draw historically on the conventions of horror and science fiction. These genres are where human cloning has been envisioned during the twentieth century, and although there were intermittent appearances in popular science writing and news outlets, human cloning was primarily figured as fictional and/or fraudulent until Dolly (Kolata, 1998). At the end of the twentieth century and the start of the twenty-first century there was a concerted move made by scientists, journalists and policy makers to represent therapeutic cloning as a viable scientific practice in factual genres. This occurred primarily in the UK where the global icon of mammalian cloning was produced, and where the first SCNT-derived human embryo was produced. However, this shift was also constituted globally, and both South Korea and the USA are implicated in this move, with different emphasis in different national terrains. Human cloning, constituted as therapeutic, is in the process of being developed as a global biotechnology through international science projects and the multiple institutes for regenerative medicine and stem cell research which have proliferated in the UK and the USA as well as many other places. Contemporary images of cloning as a curative biomedical process cast cloning much more favourably than images of corporeal horror or uncanny twinning.[8]

Contemporary filmic images of cloning draw on the repertoires of hope established in factual genres. This naturalizes the 'realism' of contemporary reporting on science establishing biomedical hope as the 'real' version of cloning. The discourse of biomedical health and regeneration that dominates figurings of human therapeutic cloning in other forms is reproduced in global media imaginaries through these films. As icons such as the image of enucleation become dominant in factual forms, they also travel across fictional film. References to films such as *The Boys from Brazil* are prolific in news media and popular science writing, whilst the visual images of science communication are seeing circulation in contemporary film. This reciprocal relationship between fictional and non-fictional forms is part of the construction of realism and intelligibility in both.

Scientists and journalists have decried the negative influence of film on understandings of science. However, I have illustrated here that in the case of human cloning films are resources in the constitution of a biomedical model of cloning. The anxieties expressed about human cloning in these films are not concerns about the horror of cloned bodies or about cloning as a horrific fiction. *The Island* and *Aeon Flux* are ambivalent, including both hope about cures and anxieties about how human cloning is deployed. Human cloning is currently constituted as a story of scientific practice and biomedical hope through multiple sources and film is emerging as a critical component in this shift. However, rather than bringing therapeutic cloning in to disrepute, these contemporary tales of technoscience contribute to the intelligibility of human reproductive cloning as plausibly benign.

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Notes

[1]Comedy is another genre which also requires an account (e.g. *Mulitplicity*, *Austin Powers: The Spy Who Shagged Me)* but this is beyond the scope of this article.

[2]This terminology is drawn from animal cloning where the phrase was in use throughout late twentieth-century cloning experiments with frogs, rabbits and cows.

[3]A fuller list of these films can be found as the appendix in Haran *et al.* 2007 and at the website: www.lancs.ac.uk/fss/cesagen/media/filmresources.htm.

[4]Science fiction as a cross media genre has dealt with cloning in multiple ways and many of the novels, films and televisual forms of science fiction depart significantly from mass-market film such as generic 'action' film. This complexity is not dealt with here and it is the specifics of Hollywood film with which this article is concerned. Feminist science fiction has been a particularly rich terrain for imagining cloning futures.

[5]The twin has also been used in body-horror versions of cloning and the twin and the grotesque are explicitly linked in the 1997 film *Alien Resurrection.* This kind of body-horror draws on nineteenth century gothic genres, and their legacy in contemporary cultural production provides a rich repository of cultural anxieties about doubling.

[6]This avant garde animated series from 1991—created by Peter Chung—doesn't bear much relation to the film. The film was disowned by Chung and appears to be largely rejected by the fan base.

[7]This film, like *The Matrix*, makes aesthetic references to Jean Baudrillard's work, in this case on cloning.

[8]As referenced in relation to *Alien Resurrection* twinning has, of course, a long history of association with the horrific, uncanny, monstrous, gothic and the grotesque, a history with which current visions of cloning continue to be intertwined. See the work of Jackie Stacey in *The Cinematic Life of the Gene* (Duke University Press, forthcoming) for further discussion and analysis of these connections.

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